

WHAT IS CLAIMED IS:

1. An exposure apparatus for illuminating a reticle with exposing light from an exposing light source via an illuminating optical system and projecting a pattern, which has been formed on the reticle, onto a substrate via a projection optical system, comprising:

a first vessel within which the illuminating optical system is placed;

- a second vessel within which the projection optical system is placed;

said first vessel having an inlet and an outlet for a first gas and said second vessel having an inlet and an outlet for a second gas;

- substitution means for substituting the first gas and/or the second gas for a gas in the interior of said first vessel and/or said second vessel; and

- exhaust means for evacuating said first vessel and/or said second vessel in order to establish negative pressure in the interior thereof when the first gas and/or the second gas is substituted for the gas in the interior of said first vessel and/or said second vessel.

2. The apparatus according to claim 1, wherein the first gas is an inert gas and the second gas is a specific active gas.

3. The apparatus according to claim 1, further comprising:

first and second vacuum sources connected to the

gas outlets of said first and second vessels,  
respectively; and

first and second vacuum-pressure controllers, which  
are provided in piping leading from said first and  
5 second vessels to said first and second vacuum sources,  
respectively, for controlling pressure within said first  
and second vessels, respectively.

4. The apparatus according to claim 3, further  
comprising changeover means for switching automatically  
10 between an evacuation mechanism, which includes the  
first and/or the second vacuum sources, and an  
atmosphere-release mechanism if concentration of the  
first gas and/or the second gas in said first vessel  
and/or said second vessel attains a predetermined  
15 concentration.

5. The apparatus according to claim 1, further  
comprising first and second escape valves for releasing  
internal pressure of said first and second vessels,  
respectively, if a differential pressure between  
20 internal pressure of said first vessel and/or said  
second vessel and the atmosphere exceeds a predetermined  
value.

6. The apparatus according to claim 1, further  
comprising:

25 first control means for controlling flow rate of  
the first gas and/or the second gas introduced into said  
first vessel and/or said second vessel; and

second control means for controlling a differential pressure between internal pressure of each vessel and the atmosphere so as to hold the differential pressure constant.

- 5 7. The apparatus according to claim 3, wherein pulsation is produced by varying internal pressure at a predetermined frequency by said first vacuum-pressure controller and/or said second first vacuum-pressure controller, thereby exhausting the gas from within said  
10 first vessel and/or said second vessel; and

internal pressure of said first vessel and/or said second vessel is caused to pulsate at negative pressure, thereby supplying the first gas and/or the second gas to said first vessel and/or said second vessel.

- 15 8. The apparatus according to claim 1, further comprising a display, a network interface and a computer for running network software;

wherein maintenance information relating to said exposure apparatus is capable of being communicated via  
20 a computer network.

9. The apparatus according to claim 8, wherein the network software provides said display with a user interface for accessing a maintenance database, which is connected to an external network of a plant at which  
25 said exposure apparatus has been installed, and which is provided by a vendor or user of the exposure apparatus,

thereby making it possible to obtain information from said database via said external network.

10. A method of manufacturing a semiconductor device, comprising the steps of:

5       placing a group of manufacturing equipment for various processes, inclusive of an exposure apparatus, in a plant for manufacturing semiconductor devices; and  
          manufacturing a semiconductor device by a plurality of processes using this group of manufacturing

10   equipment;

          wherein said exposure apparatus includes:

          a first vessel within which the illuminating optical system is placed;

          a second vessel within which the projection optical  
15   system is placed;

          said first vessel having an inlet and an outlet for a first gas and said second vessel having an inlet and an outlet for a second gas;

          substitution means for substituting the first gas  
20   and/or the second gas for a gas in the interior of said first vessel and/or said second vessel; and

          exhaust means for evacuating said first vessel and/or said second vessel in order to establish negative pressure in the interior thereof when the first gas  
25   and/or the second gas is substituted for the gas in the interior of said first vessel and/or said second vessel.

11. The method according to claim 10, further

comprising:

interconnecting the group of manufacturing  
equipment by a local-area network; and

communicating, by data communication, information  
5 relating to at least one piece of manufacturing  
equipment in said group thereof between the local-area  
network and an external network outside said plant.

12. The method according to claim 11, wherein  
maintenance information for said manufacturing equipment  
10 is obtained by accessing, by data communication via the  
external network, a database provided by a vendor or  
user of said exposure apparatus, or production  
management is performed by data communication with a  
semiconductor manufacturing plant other than said first-  
15 mentioned semiconductor manufacturing plant via the  
external network.

13. A semiconductor manufacturing plant, comprising:

a group of manufacturing equipment for various  
processes, inclusive of an exposure apparatus;

20 a local-area network for interconnecting the group  
of manufacturing equipment; and

a gateway for making it possible to access, from  
said local-area network, an external network outside the  
plant;

25 whereby information relating to at least one of the  
pieces of manufacturing equipment can be communicated by  
data communication;

wherein said exposure apparatus includes:  
a first vessel within which the illuminating  
optical system is placed;  
a second vessel within which the projection optical  
5 system is placed;

said first vessel having an inlet and an  
outlet for a first gas and said second vessel having an  
inlet and an outlet for a second gas;

substitution means for substituting the first gas  
10 and/or the second gas for a gas in the interior of said  
first vessel and/or said second vessel; and

exhaust means for evacuating said first vessel  
and/or said second vessel in order to establish negative  
pressure in the interior thereof when the first gas  
15 and/or the second gas is substituted for the gas in the  
interior of said first vessel and/or said second vessel.  
14. A method of maintaining an exposure apparatus that  
has been installed in a semiconductor manufacturing  
plant, comprising the steps of:

20 providing a maintenance database, which is  
connected to an external network of the semiconductor  
manufacturing plant, by a vendor or user of the exposure  
apparatus;

allowing access to said maintenance database from  
25 within the semiconductor manufacturing plant via said  
external network; and

transmitting maintenance information, which is

stored in said maintenance database, to the side of the semiconductor manufacturing plant via said external network;

wherein said exposure apparatus includes:

5       a first vessel within which the illuminating optical system is placed;

      a second vessel within which the projection optical system is placed;

      said first vessel having an inlet and an  
10       outlet for a first gas and said second vessel having an inlet and an outlet for a second gas;

      substitution means for substituting the first gas and/or the second gas for a gas in the interior of said first vessel and/or said second vessel; and

15       exhaust means for evacuating said first vessel and/or said second vessel in order to establish negative pressure in the interior thereof when the first gas and/or the second gas is substituted for the gas in the interior of said first vessel and/or said second vessel.